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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/668,855	09/23/2003	Torsten Niederdrank	P03,0381 (26965-3031)	3145
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SCHIFF HARDIN, LLP			LAO, LUN S	
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CHICAGO, IL 60606-6473			PAPER NUMBER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/668,855	Applicant(s) NIEDERDRANK ET AL.	
	Examiner LUN-SEE LAO	Art Unit 2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 July 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Introduction

1 This action is in response to the amendment filed on 07-09-2009. Claims 1-14 have been canceled. Claims 15 and 22 have been amended. Claims 15-26 are pending.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 15-20 and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williamson et al (US PAT. 5,091,952) in view of Kates et al. (US PAT. 6,219,427).

Consider claim 15, Williamson teaches a hearing device comprising:

a signal input device(see fig.6 ((300)) configured to receive an audio input signal and to convert said audio input signal into an electrical input signal;

a signal processor (302) supplied with said input electrical signal that modifies said electrical input signal, including amplifying at least a portion of said electrical input signal with an amplification gain, dependent on a hearing impairment to be corrected, to produce a processed signal;

a signal output device(304 in fig.6) supplied with said processed signal that emits an acoustical output signal dependent thereon; said signal input device, said signal processor and said signal output device forming a feedback loop that includes an

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acoustic feedback path(acoustic feedback) from said signal output device to said signal input device such that said acoustic input signal is influenced by feedback via said feedback path, said feedback loop exhibiting a loop gain that changes dependent on the amplification gain provided by said signal processor;

a feedback reduction device (+, - sign, (309) in fig.6) connected between said signal input device (300) and said signal output device (304) configured to adjustably reduce, compensate or damp said feedback by adjustably setting at least one adjustable parameter that influences said processed signal; and

an estimation unit (310, 302) connected between the signal input device (300) and the feedback reduction device (309) that estimates, from the electrical input signal, an estimated value of one of the optimization parameters (adaptively changeable filter coefficients of the digital filter means) which are supplied by the estimation unit to the feedback reduction device and the feedback reduction device is configured to adjustably set the at least one adjustable parameter dependent on the estimated value of the optimization parameter (flow shown in fig. 6, in particular, filter 309 and adder that adds 300 and 309) (See col. 8 line 1-col. 9 line 36); but Williamson does not explicitly teach that the optimization parameters include a system distance defined as a distance of the loop gain to a predetermined stability limit of the feedback loop.

However, Kates teaches an estimation unit (see fig.4(402,210,206)) connected between said signal input device (202) and said feedback reduction device (+, - sign, (212)) that estimates, from said electrical input signal(202), an estimated value of a system distance, said system distance being defined as a distance of said loop gain to a

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predetermined stability limit of said feedback loop (see fig. 10 and col.14 line 51-col. 15 line 30), said estimation unit supplying said estimated value to said feedback reduction device and said feedback reduction device being configured to adjustable set said at least one adjustable parameter dependent on said estimated value (see col. 11 line 42-col. 12 line 16). Kates teaches optimization via adjusting the distance / system distance (recommended gain for the design) with respect to a predetermined stability limit of the feed back loop (maximum stable gain). See kates, col. 6, lines 3-29.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Kate in to Williamson to provide a hearing aid for desired audio sound quality at various acoustical environment . When the teachings of Williamson and kates are combined, it would have been obvious that the optimization parameters of Williamson include a system distance defined as a distance of the loop gain to a predetermined stability limit of the feedback loop. In the combined teaching, such a system distance / optimization parameter would have been supplied to the feedback reduction device which would have adjustably set the at least one adjustable parameter dependent on the estimated value of the system distance.

Consider claim 22, is essentially similar to claim 15 and is rejected for the reason stated above apropos to claim 15.

Consider claim 16, Williamson teaches a hearing aid comprising a memory, accessible by said estimation unit (310 in fig.6), in which a model(308) is stored that represents a typical frequency response of a speech signal, and wherein said estimation device is configured to detect a first signal portion (302) and a second signal

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portion (310) from said electrical input signal (300) and to use said model to generate an estimated signal from said first signal portion that estimates said second signal portion, and to determine said estimated value from a difference of said estimated signal from said second signal portion detected from said electrical input signal (see col. 7 line 66-col. 8 line 68).

Consider claim 23, is essentially similar to claim 16 is rejected for the reason stated above apropos to claim 16.

Consider claim 17, Williamson (fig.6) does not explicitly teach said estimation device extracts said first signal portion as a high-frequency portion of said electrical input signal and extracts said second signal portion as a low-frequency portion of said electrical input signal.

However, Williamson teaches said estimation device (see fig.2 (50)) extracts said first signal portion as a high-frequency portion(see fig.3 (60)) of said electrical input signal (30) and extracts said second signal portion as a low-frequency portion(62) of said electrical input signal (30 and see col.5 line 10-68).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Williamson (fig.3) into Williamson (fig.6) to improve the gain at high frequencies while simultaneously preserving the desired tonal inputs at low frequencies.

Consider claim 24, is essentially similar to claim 17 is rejected for the reason stated above apropos to claim 17.

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Consider claim 18, Kates teaches a hearing aid, wherein said estimation device comprises a feature extractor (see fig.4, 210) that is configured to extract respective features from said first signal portion (such as, above threshold) and said second signal portion (such as, below the threshold) for producing said estimated signal (see fig. 21 and col. 18 line 64-col. 19 line 18).

Consider claim 25, is essentially similar to claim 18 is rejected for the reason stated above apropos to claim 18.

Consider claims 19 and 20, Williamson teaches a hearing aid wherein said feedback reduction device comprises a feedback compensator (see fig.6 and see col. 8 line 8-col.9 line 6); and a hearing aid wherein said feedback reduction device comprises an amplification/compression control circuit (see fig.24 and see col. 8 line 8-col.9 line 6).

4. Claims 21 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williamson et al (US PAT. 5,091,952) as modified by Kates et al (US PAT. 6,219,427) as applied to claims 15 and 22 above, and further in view of Nielsen et al (US PAT. 7,106,871) .

Consider claim 21, Williamson as modified by Kates does not explicitly teach a hearing aid wherein said feedback reduction device comprises at least one oscillation detector and at least one narrow- band filter device configured to suppress oscillations, as said at least one parameter, dependent on said estimated value.

However, Nielsen teaches a hearing aid wherein said feedback reduction device comprises at least one oscillation detector (see fig.2 (49)) and at least one narrow- band

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filter device(8) configured to suppress oscillations, as said at least one parameter, dependent on said estimated value(see fig.2-3 and col. 6 line 15-col. 7 line 67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Nielsen into the teaching of Williamson and Kate to provide a hearing aid for feedback cancellation, which improves the result of the feedback cancellation by having fewer audible side effects and thereby gives an improved user comfort.

Consider claim 26, is essentially similar to claim 21 and is rejected for the reason stated above apropos to claim 21.

Response to Arguments

5. Applicant's arguments with respect to claims 15-26 have been fully considered but they are not persuasive.

Applicant argued in substance that Williamson does not teach system distance and Williamson evaluates feedback and models the transfer function as a delay function 308 (Remarks, pages 13-14). Applicant further argued that Kates does not use the system distance in the manner set forth in independent claims 15 and 22 (Remarks, pages 13, 15-16). Applicant further argued that it is not obvious to combine Williamson and kates by rejecting the use of the pure delay function of Williamson and to instead make use of the system distance disclosed by kates (Remarks, page 14).

The examiner responds as follows. First regarding Williamson, as discussed in the rejection of claim 15, Williamson is relied on to teach, among other features, a feedback

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reduction device (fig. 6, filter 309 and adder that adds 300 and 309) connected between the signal input device (300) and the signal output device (304) configured to adjustably reduce, compensate or damp the feedback by adjustably setting at least one adjustable parameter (filter coefficients) that influences the processed signal. Williamson also teaches an estimation unit (310, 302) connected between the signal input device (300) and the feedback reduction device (309) that estimates, from the electrical input signal, an estimated value of one of the optimization parameters (adaptively changeable filter coefficients of the digital filter means) which are supplied by the estimation unit to the feedback reduction device and the feedback reduction device is configured to adjustably set the at least one adjustable parameter dependent on the estimated value of the optimization parameter (flow shown in fig. 6, in particular, filter 309 and adder that adds 300 and 309). See col. 8, line 8 - col.9, line 5. What Williamson does not explicitly teach, but taught by kates, is that the optimization parameters include a system distance defined as a distance of the loop gain to a predetermined stability limit of the feedback loop. When the teachings of Williamson and kates are combine, it would be obvious that the optimization parameters of Williamson include a system distance defined as a distance of the loop gain to a predetermined stability limit of the feedback loop. In the combined teaching, such a system distance / optimization parameter would be supplied to the feedback reduction device which would adjustably sets the at least one adjustable parameter dependent on the estimated value of the system distance. It is noted that while Williamson teaches modeling the transfer function of the acoustic feedback as a pure delay function 308 in order to compensate for the time it takes for the acoustic

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signal to travel from the hearing aid output to the microphone input, it is not the only optimization/adjustment means. Others include filter 309 and filter estimator 310 with values which are adjusted / updated / fit to each individual situation. (Williamson, col. 8, lines 1-21, 51-52 and 64-67). Applicant's characterization of Williamson is incomplete. Further applicant admitted that using system distance to assess the stability of a system experiencing feedback is "commonly used and well-understood" (Remarks, page 13, 3rd paragraph). Following KSR, it would have been obvious to incorporate such well known technique into Williams to achieve its predictable results of optimization.

Secondly regarding Kates, while kates determines the maximum gain, it is not the teaching relied on in the interpretation. Instead, what is relied on is the teaching of optimization via adjusting the distance / system distance (recommended gain for the design) with respect to a predetermined stability limit of the feed back loop (maximum stable gain). See kates, col. 6, lines 3-29. It is noted that it is the combination of Williamson and Kates, rather than kates alone, that meets the claimed estimation unit of claim 15.

Thirdly regarding the combination, the combination of Williamson and Kates meets claim 15 as discussed above. The motivation to combine does not rely on rejecting the use of the pure delay function of Williamson and instead using the system distance of Kates. Rather, in addition to being in the same field of endeavor, Williamson discloses and desires a variety of optimization routes to obtain optimal filter coefficients / at least one adjustable parameter that influences the processed signal (Williamson, col. 8, lines 1-67). Kates discloses an additional optimization means via system distance

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(Kates, col. 6, lines 2-45). It would be obvious to include the system distance into the optimization parameters of Williamson because in so doing the whistling due to feedback in unstable hearing aids amplification system can be eliminated (Kates, col. 3, lines 18-20). Further applicant admitted that using system distance to assess the stability of a system experiencing feedback is “commonly used and well-understood” (Remarks, page 13, 3rd paragraph). Following KSR, it would be obvious to incorporate such well known technique into Williams to achieve its associated predictable advantages.

Therefore, the combination of Williams and Kates meets applicant’s invention as claimed. Applicant’s arguments are not persuasive.

Conclusion

6. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kates et al. (US 2002/0064291) is cited to show other related the feedback compensation for hearing devices with system distance estimation.

8. Any response to this action should be mailed to:

Mail Stop ____ (explanation, e.g., Amendment or After-final, etc.)

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Facsimile responses should be faxed to:

(703) 872-9306

Hand-delivered responses should be brought to:

Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lao, Lun-See whose telephone number is (571) 272-7501. The examiner can normally be reached on Monday-Friday from 8:00 to 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin, can be reached on (571) 272-7848.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 whose telephone number is (571) 272-2600.

Lao, Lun-See
/LUN-SEE LAO/
Examiner, Art Unit 2614
Patent Examiner
US Patent and Trademark Office
Knox
571-272-7501
Date: 10-09-2009

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/Vivian Chin/

Supervisory Patent Examiner, Art Unit 2614